

Development of Sorghum Biscuit Incorporated with Orange Peel Powder and Dragon Fruit Pulp

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ABSTRACT

BISCUIT – A baked flour confectionary down to low moisture content. Name is derived from the Latin word bis coccus, meaning cooked twice. It is basically a small quick bread made from dough that has been rolled out and cut or dropped from a spoon. The basic old biscuit lacks nutrition it majorly consist of carbohydrates. As sorghum is rich source of fibre and. It is also rich in other nutrients, vitamins minerals and they are also good source of antioxidants. The main aim for the development of nutritious biscuit was to meet the increasing demand of healthy diet for human. The samples were subjected to estimate for moisture, estimate for ash content, crude protein, crude fibre and carbohydrate and sensory evaluation. On the basis of present study it can be concluded that this biscuit is an excellent source of fibre and protein.

KEYWORDS: *Sorghum, Biscuit, Nutritious, Fibre, Protein*

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1. INTRODUCTION

Biscuit is a term used for a variety of baked, commonly flour-based food products. Indian Biscuits Industry is the largest among all the food industries and has a turnover of around Rs.3000 crores. India is known to be the second largest manufacturer of biscuits, the first being USA. Biscuits were assumed as sick man's diet in earlier days(1). Now, it has become one of the most loved fast food products for every age group. Biscuits are easy to carry, tasty to eat, cholesterol free and reasonable at cost.

Orange peel is a great source of antioxidants and dietary fibre. In the current lifestyle scenario, people are becoming more aware of functional key ingredients and thus the demand for functional foods is increasing. Particularly, the peels have a higher concentration of phenolics than the edible parts and are a rich source of natural flavonoids (2). The peel has a higher concentration of flavonoids than any other portion of the citrus fruit, and those flavonoids are divided into six odd types based on their chemical makeup: flavones, flavanones, flavonols, isoflavones, anthocyanidins, and flavonols.

Traditional Indian sweeteners like jaggery and khandsari, which are made from sugarcane in addition to sugar, are manufactured. Jaggery is also known as Gur in India, Desi in Pakistan, Panela in Mexico and South America, Jaggery in Burma and other African nations, Hakuru in Sri Lanka, and Naam Taan Oi in Thailand. (3) Jaggery is a nutritious food. It includes 0.6% to 1.0% minerals¹², with iron (11 mg%), calcium (0.4%), magnesium, and phosphorous (0.045%) being significant ones. Protein (0.25%), fat (0.05%), and reducing sugars such as glucose and fructose (10–15%) are also included in jaggery. Khandsari includes fewer of these elements since the sugar crystals only have a thin layer of molasses coating them. Jaggery consumption on a regular basis could lengthen lifespan(4).

An edible fruit belonging to the *Hylocereus* genus is the dragon fruit, often known as pitaya or pitahaya. Most commonly found in subtropical and tropical climates, *Hylocereus* species are herbaceous perennial climbing cacti that are extremely drought tolerant. Southern Mexico, Guatemala, and Costa Rica are its

native countries (5). The edible black seeds are scattered throughout the fruit pulp of all species of dragons, which has a pleasant flavour and is rich in nutrients like soluble sugars, proteins, minerals like potassium, magnesium, and calcium, as well as other bioactive compounds (6). When type 2 diabetics ate dragon fruit, their levels of LDL cholesterol, triglycerides, and total cholesterol were significantly lowered, but their levels of HDL cholesterol increased. Additionally, it effectively lowers blood glucose levels in type II diabetes individuals and improves insulin resistance in rats (7).

Sorghum is an important cereal grain and an important food and fodder crop in semi-arid regions of the world. Sorghum species (*Sorghum vulgare* and *Sorghum bicolor*) belong to the Poaceae family(8). Sorghum is known by many names. West African large millet and guinea corn. South African kaffir corn. Sudan dura. Mutama of East Africa. Jowar of India and Gaoliang of China. Proteins form the second major component of sorghum grains(9). The protein content of sorghum is known to vary along with the changes in its amino acid composition. Sorghum has a higher crude fat content (3%) than wheat or rice. Sorghum is a rich source of B-complex vitamins. Other fat-soluble vitamins, namely D, E, and K, have also been found in sorghum grain(10).

2. Preparation of Biscuit

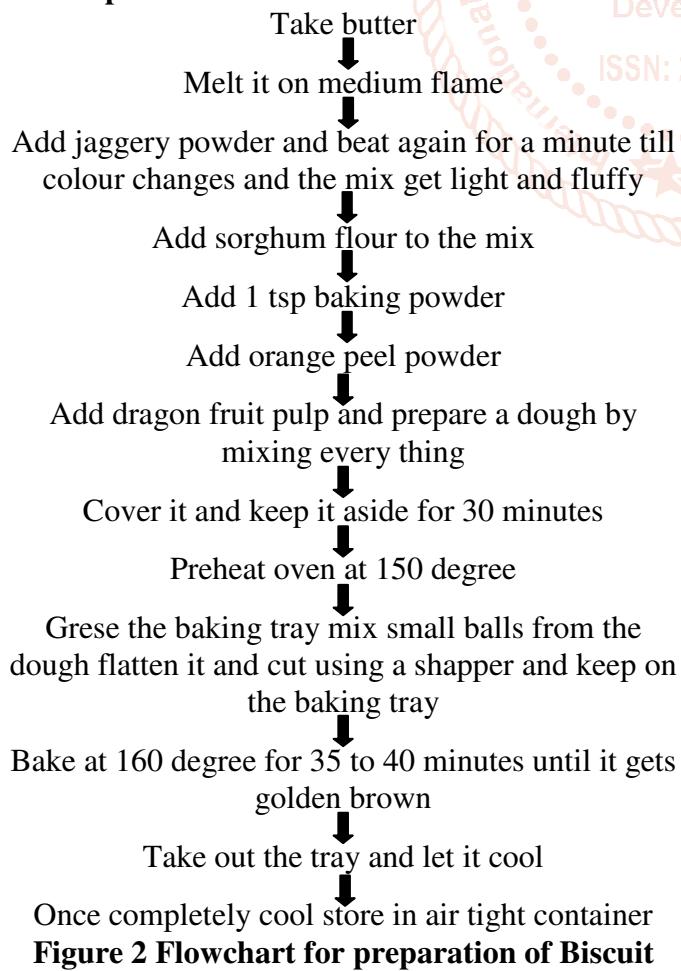


Figure 2 Flowchart for preparation of Biscuit

2.1. Formulation of Biscuit:

Table 2.1: Formulations of Biscuit

Sr. No	Ingredients	S1	S2	S3
1.	Sorghum	168gm	162gm	156gm
2.	Jaggery	20gm	20gm	20gm
3.	Orange Peel Powder	12gm	18gm	24gm

2.2. Proximate analysis:

The different parameters such as Moisture, Fat %, Total Ash, Protein, Carbohydrate, Calcium were analyzed by different methods.

Moisture:

The Moisture of the samples was assessed using Annex B of IS 15271-2003 RA 2019.

Total Ash:

The Total Ash % was assessed using Annex B of IS: 15271 (2003) RA2013 Ed 1.1 (2006-02).

Fat:

The Fat was assessed using Cl.10 of IS 6287:1985 RA2015 (Page 13)/Appendedix B of IS: 4079:1965 RA2011 (Page 7).

Protein:

The Protein of the samples was assessed using Cl.11 of IS 6287: 1985 RA2015 (Page 17).

Carbohydrates:

The Carbohydrates of the sample was assessed using FAO Chapter 2, 2003.

Calcium:

The Calcium of the sample was assessed by AES/SOP/005/19 by Flame Photometry Method.

2.3. Sensory Evaluation of Biscuit

For all three trials, the biscuit sensory evaluation was recorded. Five semi-trained panellists from the Department of Food Technology of Parul University, Vadodara, conducted sensory evaluations using a 9-point hedonic scale ranging from 1 (extremely dislike/ most undesirable) to 9 (extremely like/most desirable). A test proforma was also supplied to the panellists at the time of evaluation. It is given here, 9 = like extremely, 8 = like very much, 7 = like moderately, 6 = like slightly, 5 = neither like nor dislike, 4 = dislike slightly, 3 = dislike moderately, 2 = dislike very much, 1 = dislike extremely, for various parameters, including appearance, texture, taste, consistency and overall acceptability. All panellists were Asst. professors and P.G. students between the ages of 23 and 40.

3. Results and Discussion

3.1. Sensory evaluation of biscuit

The mean scores for sensory of S1, S2, and S3 samples are shown in Figure. Sample S2 containing

18gm Orange peel powder had the highest scores for appearance, texture, taste, consistency and overall acceptability. The increase in the quantity of Orange peel powder seems to have contributed to improvements in appearance, texture, taste and consistency. The addition of Orange powder play important role in higher overall acceptability of the finished product.

Graphical representation of sensory evaluation

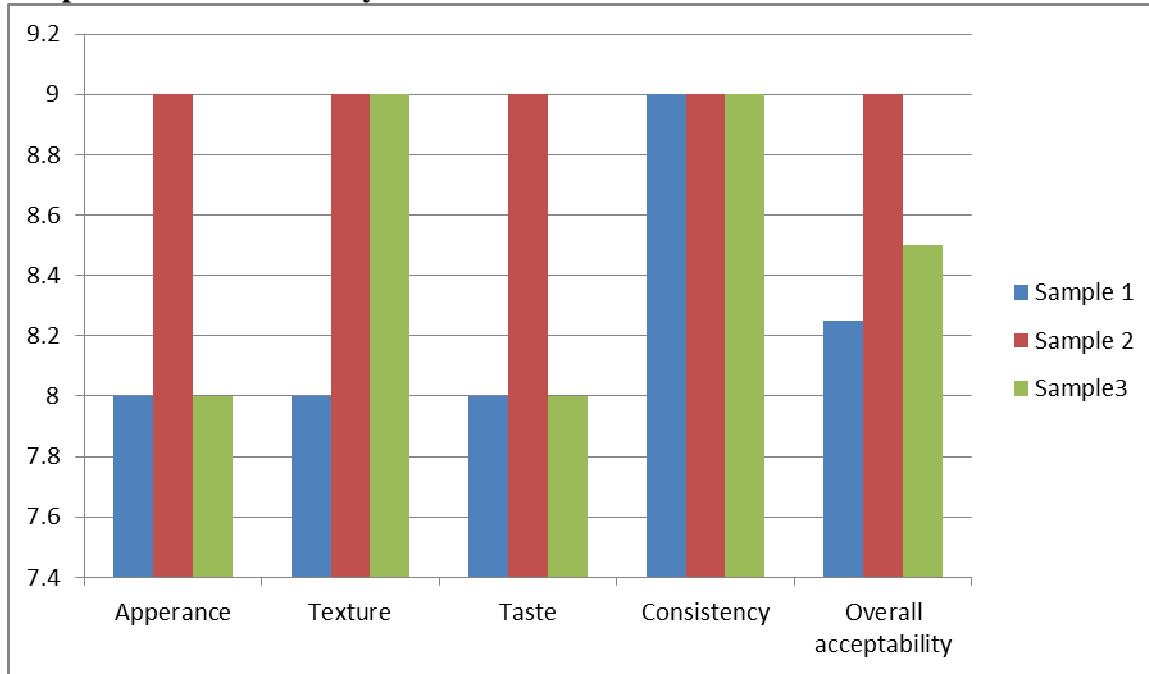


Figure 3.1.1 Sensory Evaluation Parameters

3.2. Proximate Analysis of Biscuits

The Proximate such as Moisture, Total Ash, Fat, Protein, Carbohydrate and Calcium were analysed by different methods.

Table 3.2.1 Chemical Analysis of Biscuit

Sr. No.	TEST NAME	RESULTS
1	Moisture %	6.65
2	Total Ash %	2.67
3	Fat, g/100g	7.66
4	Protein, g/100g	6.81
5	Carbohydrate, g/100g	76.21
6	Calcium, mg/100g	272.44

4. Conclusion

These results indicate that Biscuit made from sorghum biscuit incorporated with orange peel powder and dragon fruit pulp have more health benefit than the other biscuits available in the market. The improvement of food is a crucial strategy for preventing certain nutritional deficiencies. Additionally, to prevent obesity, prevent diabetes, lower incidence of cardio vascular diseases, helps in weight loss, make skin glow and also provide antioxidants.

Samples S1 and S3 had an acceptable but slightly below-average flavor. These samples received lower ratings for look and flavour than Sample S2, which contained 18g of Orange Peel powder. The physical characteristics and chemical makeup of Sample S2, which was found to be acceptable over the other two samples, were then compared to those of the control sample.

Compliances with ethical standards

Acknowledgments

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Disclosure of conflict of interest

The authors declare that there is no conflict of interest.

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